THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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THRIPS INJURY OF PEANUT SEEDLINGS

G. M. Shear and L. I. Miller

During the spring of 1938 our attention was called to a diseased condition of peanut seedlings referred to by the growers as "pouts." The most widely observed symptoms of this disorder are irregularly shaped puckered leaflets with a number of white spots on the surface (figure 1). The smaller spots are usually round and about a millimeter in diameter, while the larger ones are irregular in outline and may be several times as large. These symptoms are associated with a slow rate of growth during the seedling stage of the plant and it is from the slow rate of development that the disease derives its name.

In 1937, Metcalf (4,5) described a condition of peanut seedlings resulting from injury by the common potato leafhopper, which he says was referred to by growers as "pouts." He writes, "This disease appears first as a distinct blackish discoloration at the tip of the leaflet and the discoloration progresses gradually toward the base of the leaflet until the whole leaflet is involved. If the disease is severe the entire leaf turns blackish, shrivels and dies." According to this description the symptoms described by Metcalf are obviously different from those described in the first paragraph except for the more or less stunted condition of the plants.

At a conference on peanut culture held in North Carolina in the fall of 1938, attended by agronomists, entomologists, and plant pathologists of the U. S. Department of Agriculture, Virginia, North Carolina, and South Carolina, "pouts" was discussed. It was reported as being common throughout the peanut-producing area of the Southeastern United States and several factors such as nutritional deficiencies, viruses, and insects were suggested as the possible cause.

Since no disease organisms were associated with the chlorotic spots on the affected leaflets, it was at first thought that they might be caused by some nutrient deficiency, one hypothesis being that during the establishment of the first colonies of nodule-forming bacteria the nutrition of the plant was temporarily unbalanced. This explanation of the disorder was eliminated by growing plants in different soils in the greenhouse. No root nodules were formed on the plants in one of these soils, yet all of the plants developed leaf symptoms of "pouts." As this diseased condition was reported as being common over the entire peanut section of the Southeastern United States, the possibility of its being nutritional seemed quite unlikely.

In June 1939 peanut seedlings were collected in which the bud leaves were dead and blackened. An examination of these dead leaves

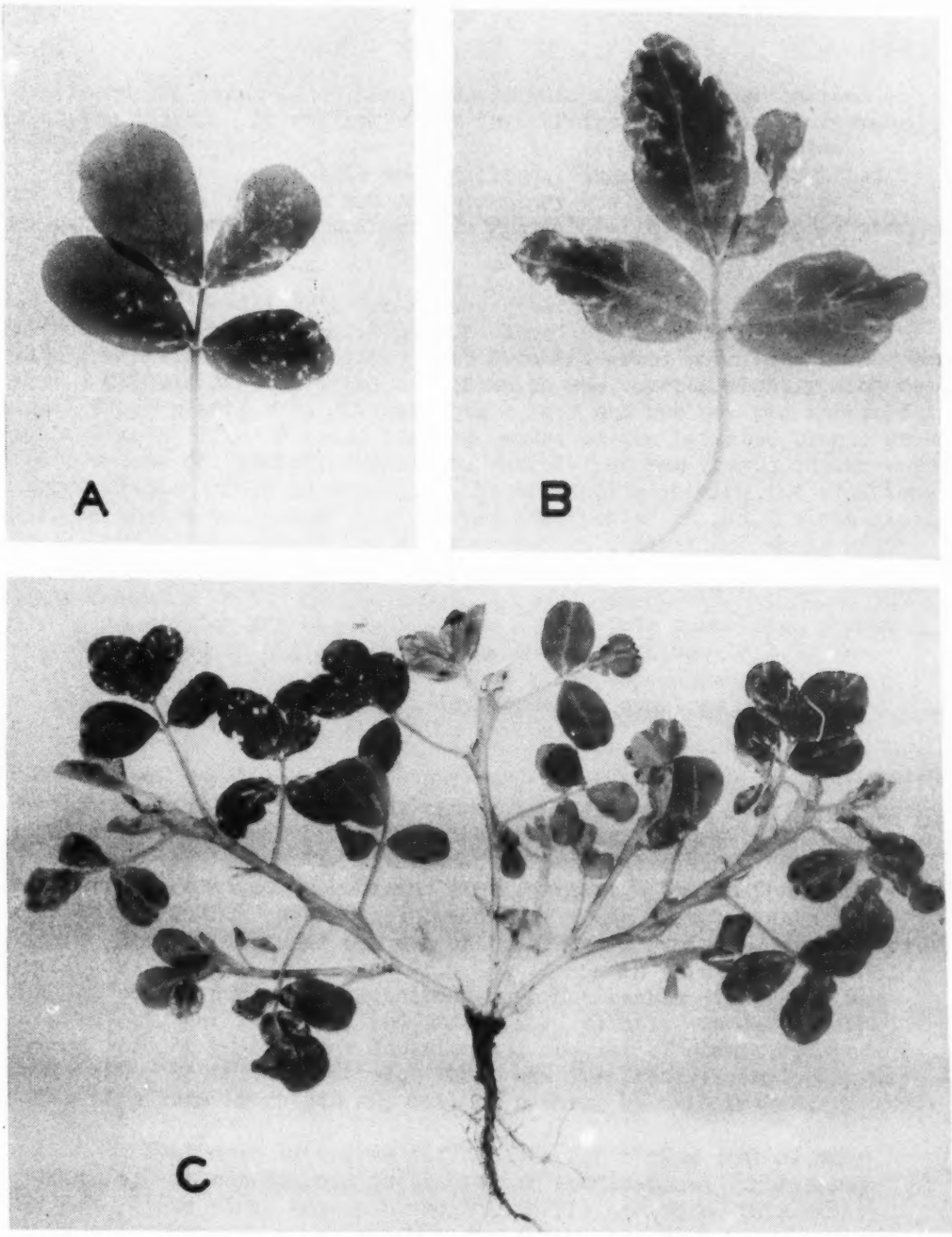

Figure 1. — A. Thrips injury on peanut leaf from plant grown in greenhouse and infested with thrips under controlled conditions. Photographed April 12, 1940.

B. Leaf of peanut plant showing thrips injury resulting from natural infestation under field conditions.

C. A young peanut plant showing various degrees of thrips injury.

disclosed the presence of thrips which were apparently associated with the injury. It was suggested that thrips might also be responsible for the symptoms shown in figure 1. At this time specimens of the thrips found on peanuts near Holland, Virginia were identified by Floyd Andre of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, as Frankliniella fusca (Hinds) and F. tritici (Fitch).

Peanut seedlings grown in the greenhouse during the spring of 1940 developed symptoms of "pouts." These plants were placed in a closed container and fumigated with nicotine after which each was covered with a celluloid collar, the top of which was covered tightly with muslin. These plants were divided into 2 sets and one set was infested with thrips. After 2 weeks the new leaves on the infested plants showed the symptoms of "pouts", figure 1A, whereas the new leaves on the uninfested plants showed no injury. This test while showing the relationship of thrips to "pouts" also showed that"pouts" is not a virus disease, as all the plants showed the symptoms before fumigation, while only those reinfested with thrips developed the symptoms after fumigation.

In another greenhouse test one lot of pots containing peanut seed was placed in a glass case while another lot was left in the open greenhouse. The seedlings in the glass case showed no signs of leaf injury while the others developed the symptoms of "pouts" and were found to be infested with thrips.

Tests were conducted at Holland, Virginia, in 1940 to obtain further data in the field. As naphthalene flakes had been found to be of value in the control of thrips on gladiolus corms (3) it was decided to try fumigating with paradichlorobenzene since this material had largely replaced naphthalene as a fumigant. Wooden frames 8' x 1' x 8" with a muslin cover were placed over young peanut plants in a field. The plants under one set of covers were fumigated at weekly intervals from May 28 to June 25. The plants in this field showed little "pouts" during this period and no noticeable difference was observed between fumigated and unfumigated plants. On June 25 the frames were moved to a new location and one set of plants sprayed every other day with Nicotrol. There was insufficient thrips injury after this date to obtain any data on control by this method.

In 1941 more extensive field tests for thrips control were conducted. It was decided to use tartar emetic-brown sugar spray in these tests since Anderson and Walker (1) had found this spray to be effective against onion thrips on peanuts under greenhouse conditions. The spray was used at the concentration recommended by Johnson and Smith (2), which is 2 pounds of tartar emetic and 4 pounds of brown sugar per 100 gallons of water. In addition to this soybean flour was used at the rate of 1/2 tablespoonful per gallon as a spreader in the hope that it would cause the spray to flow between the unopened leaflets where the thrips do their damage. Spraying

tests were made in 5 fields. In each field, one row was selected and alternate groups of 10 or 12 plants sprayed, the adjoining row being used as a check on the effectiveness of the spray. The dates of application of the spray are shown in table 1. They are spaced so that the interval between applications was no greater than a week but additional applications were made after rains.

Leaf samples were collected on June 25 and July 10. These samples consisted of 10 unopened leaves from both the sprayed and unsprayed plants in each field. The leaves were placed in formaldehyde solution and the thrips later counted with the aid of a binocular microscope. The results of these counts are presented in table 2. It may be seen from these results that the spraying gave a reduction of 49.5 percent in the number of thrips on June 25. At the time of this sampling the sprayed plants showed noticeably less leaf injury than the unsprayed plants. On this same date a sample of 10 leaves was collected from a field where the plants were recovering from "pouts", and the new leaves were showing only a small amount of spotting. Only 39 thrips were found on this sample which was less than were found on any of the other samples collected.

Table 1. - Dates of application of tartar emetic-brown sugar spray to peanut plants in relation to precipitation.

Date	Rainfall, inches	Date	Rainfall, inches	Date	Rainfall, inches	Date	Rainfall, Inches
May 21*		June 3	1.15	June 16		June 29	.20
22		4*		17		30	.20
23	.06	5	.60	18*		July 1	
24*		6		19		2*	
25		7*		20		3	
26		8		21		4	
27		9		22		5	.50
28*		10		23	.31	6	.30
29		11		24	.80	7	.55
30		12	.14	25		8	.15
31	.35	13	.65	26*		9	
June 1		14*		27	.20	10	
2*		15	.80	28	.90		

* Date of applying spray.

Table 2.- Effectiveness of tartar emetic-brown sugar spray under field conditions in controlling thrips on peanut plants as shown by counts of the number of thrips on ten unopened bud leaves for treatments at each location.

Field No.	Date of sampling: June 25			Date of sampling: July 10		
	Number of thrips on sprayed	Number of thrips on unsprayed	Percent control	Number of thrips on sprayed	Number of thrips on unsprayed	Percent control
1	61	128		46	77	
2	43	124		76	185	
3	82	124		147	212	
4	61	179		86	89	
5	94	120		65	44	
Total	341	675	49.5	420	607	30.8

Another set of samples was collected from the test field on July 10, which was nearing the end of the season for pouts particularly on the older plants. The plants had not been sprayed since July 2 and a 4-day rainy period had intervened. Even so the number of thrips was 30.8 percent less on samples from the sprayed plots.

The spraying tests with tartar emetic while substantiating the data obtained from greenhouse experiments, that thrips are responsible for the leaf injury associated with "pouts", also show that this insecticide is not a satisfactory material for controlling thrips on peanuts under field conditions. This is easily understood when it is realized that normally under field conditions thrips on peanuts feed almost exclusively in the unopened leaflets of the bud and would have very little opportunity of feeding on tissue covered by the spray.

This feeding habit of thrips on peanuts is undoubtedly responsible for their not having been shown to be the cause of this spotting and distortion of the leaves. Ordinarily thrips injury appears as an etching on the surface of the leaf due to the rasping action of their mouthparts in feeding. In this case the thrips are not readily seen and as the leaves grow rapidly after having been fed upon the areas where feeding has taken place appear as white sunken spots. The growth rate of the tissue in these areas is retarded, which results in the crinkling and puckering of the leaflets. Under certain conditions when the number of thrips per leaflet is high (over 20 thrips were found on several occasions on a single leaflet) the leaflets turn black and die. This blackening and killing of the leaf is apparently due to some weakly parasitic organism developing in the

injured tissue and is similar to blackening of the leaves described by Metcalf (5) as sometimes following leafhopper injury.

Since the term "pouts" is not specific but has been applied to different conditions that may cause a stunting of peanut seedlings, the use of this word should be discouraged and in the case of the symptoms described in this article, thrips injury used instead.

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(Virginia Agricultural Experiment Station).

VIRUS DISEASES OF PEACH IN WESTERN COLORADO

E. W. Bodine and L. W. Durrell

The X-disease or yellow-red virosis of peach was found in 1940. Surveys were made in cooperation with the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, to determine the prevalence of the disease. Approximately 50 cases were found. On August 1, 1940, buds taken from diseased trees were inserted into 30 Elberta peach test trees. Sixty percent of the trees inoculated showed symptoms between June 16 and July 1, 1941. Diseased trees marked in the orchard in 1940 likewise expressed symptoms on June 16 of this year. Spread maps of two orchards made in 1940 revealed that no visible spread had taken place by 1941.

Chokecherries [Prunus demissa], which are known to harbor the virus, were not found in the immediate vicinity of the affected peach orchards. Although abundant in the Grand Mesa area, none of the chokecherries when examined in August of this year showed symptoms of the X-disease.

Eradication of all peach trees showing symptoms of the X-disease is now in progress.

Golden-net virus disease of peach. This virus disease of peach, to the best of the writers' knowledge, has only been reported from Colorado. It has been described in a recent publication from Colorado (Bodine, E. W. and L. W. Durrell. Host range of peach-mosaic virus in Western Colorado. Phytopath. 31: 322-333. 1941.), as the apricot-plum mosaic disease. Since this publication, however, it has been found that its occurrence is more frequent on the Elberta peach. On peach the characteristic symptom is the marginal yellowing of the veins. Because of this outstanding constant symptom the disease is now called "golden net." In addition to the above symptom, irregular areas of primuline yellow are evident in the leaf blade during the growing season. Fruits on the affected trees are normal in size, shape, and color.

(Colorado Agricultural Experiment Station).

ASSOCIATION OF PIERCE'S DISEASE OF GRAPEVINES AND ALFALFA DWARF IN CALIFORNIA

Wm. B. Hewitt and Byron R. Houston

Pierce's disease of grapevines, formerly known as the "Anaheim disease" and "The California vine disease", is increasing rapidly in many of the vineyards of California and has completely destroyed many vineyards in some districts.

It has been demonstrated that Pierce's disease is caused by a virus which is transmissible by grafting (Hewitt. Phytopath. 29: 10. 1939). The development of this disease in the vineyards indicates that an insect vector is responsible for its spread.

In several districts the rapid spread of Pierce's disease is correlated with proximity to alfalfa fields. Many vineyards have been observed where the development of Pierce's disease has been very rapid in that portion of the vineyard adjacent to alfalfa.

The dwarf disease of alfalfa, known to be caused by a virus (Weimer, J. L., Journ. Agr. Research 53:333-337, 1936), has been present in areas of southern California for a number of years in the same regions where Pierce's disease has been very severe. Dwarf is now very common in alfalfa fields in the San Joaquin Valley areas where Pierce's disease has recently become an important factor in grape production. The nature of the spread of alfalfa dwarf indicates that an insect vector is involved.

Grape and alfalfa growers have often called attention to the fact that there were more plants affected by these virus diseases in wet portions of their fields where various kinds of grasses grow luxuriantly. Also, it is true that usually the first plants to be-

come affected either in the alfalfa fields or vineyards are those along the edges adjoining irrigation canals, ditches, roadsides, and fences where Bermuda and other grasses have been allowed to grow freely.

The apparent association of these two diseases might be explained in one of the following three ways:

(1) The two diseases may be caused by the same virus and transmitted by the same vector or vectors. The vector or vectors may prefer to feed upon the alfalfa and grasses and only feed upon the adjacent grapes when the alfalfa is cut or the grasses become dry.

(2) Each disease may be caused by a different virus and transmitted by the same or different vectors which because of host relationship are present in large numbers in these areas. Such vectors may normally prefer to feed upon the adjacent grasses and feed on alfalfa and grapes only by accident or when forced to do so following the death or destruction of the grasses.

(3) Further investigations may show that the two diseases have no connection whatsoever and their close geographical association may be merely coincidental.

(University of California).

FIELD TESTS WITH A STAMINATE CLONE OF ALPINE CURRANT IMMUNE FROM BLISTER RUST UNDER GREENHOUSE CONDITIONS.

Glenn Gardner Hahn

The alpine currant, Ribes alpinum L., is an ornamental species that has become locally popular in landscape gardening in the Middle West. The immunity from white pine blister rust (Cronartium ribicola Fischer) under greenhouse conditions of a staminate clone of this European species has been reported recently (4). In the late summer of 1940, plants of the immune staminate clone and plants of a susceptible pistillate clone, all of which were used in the greenhouse experiments (4) mentioned above, were planted in the northeastern part of Connecticut near Norfolk for field testing, along with the known rust-susceptible prickly or pasture gooseberry (Ribes cynosbati L.). The latter, a native ribes growing in the eastern part of the United States, was used as a "check" to establish the presence of natural inoculum, and the suitability of the environmental conditions for infection. One alpine plant of each sex, together with a check, was planted in fairly dense shade on the bank of a small stream. At

the same time 2 specimens of the pistillate clone and 3 of the staminate clone were planted with the prickly gooseberry in a cultivated vegetable garden situated on an open site fully exposed to the prevailing winds.

The experimental ribes, both in the shade and in the open, produced healthy growth in 1941, those in the open being particularly vigorous. The 4 staminate plants of the previously reported rust-immune clone (4) resisted infection, i.e., fertile fruiting bodies of Cronartium ribicola did not appear. In the case of the rust-immune Viking red currant from Norway, the writer (3) described necrotic flecks associated with blister rust infection that did not result in the production of fertile fruiting bodies. This symptom of resistance, which was investigated cytologically by Anderson (1), was not observed on leaves of the staminate plant of Ribes alpinum.

On the other hand, the 3 pistillate plants all became infected. The plant growing in the shade produced comparatively small leaves of thin texture. The degree of infection for this plant could be rated as slight (2), i.e., less than 10 percent of the total leaf surface was colonized by the rust. By August mostly telia were found and these were light brown in color (Snuff Brown (5)), and longer and narrower than those produced on leaves in the open. Similarly, less necrosis of infected leaf tissue occurred in association with telial formation.

The pistillate plants growing in the open were exceptionally robust and produced upright stems with large, thick, dark green leaves (3-6 mm. across). Approximately 50 percent of the total leaf surface showed infection. By August telia were not only more numerous as compared with telium-production on the pistillate plant of the same clone growing in the shade, but also they were somewhat shorter, broader, and of a reddish-brown color (Walnut Brown (5)). Old infection areas on leaves growing in full sunlight became necrotic (6, p. 54).

The known-susceptible prickly gooseberry plants used as checks became infected both in the shade and in the open, rust infection on the former site being less than that on the latter. In mid-August the wild gooseberry growing on the exposed site was producing new, vigorous leaves that showed the uredial stage of the rust. If these new leaves had not been collected it would have been interesting to observe whether telia were produced on them in the autumn -- a common occurrence with wild ribes. In this experiment leaves of all susceptible ribes tested were removed in order that the rust would not spread to pine in the neighborhood.

These field infection tests conducted under natural conditions supplement and corroborate greenhouse tests performed in 1937 and 1938 with the same plants of Ribes alpinum. At that time inoculation

experiments demonstrated that these pistillate plants were susceptible, whereas the staminate plants were rust-immune.

Grateful acknowledgment is accorded Messrs. J. E. Riley, Jr., and Alton Miller, Division of Plant Disease Control, Bureau of Entomology and Plant Quarantine, for their able cooperation in making it possible to conduct the above field tests under very favorable conditions.

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(Division of Forest Pathology, Bureau of Plant Industry, cooperating with Osborn Botanical Laboratory, Yale University, New Haven, Connecticut).

BLIGHTED BARLEY IN NEBRASKA

M. W. Felton

Reports in July 1941 to the effect that some of the early marketed Nebraska barley had received a classification of "blighted" at Kansas City caused considerable concern throughout eastern and southern counties where increased acreage and heavy yields had resulted in a record crop. Frequent rains in some localities had induced considerable kernel discoloration and a few barley samples were graded as high as 38 percent blighted at terminal markets. To many farmers the market term "blighted" suggested "scab" or "fusarium

blight" and a good deal of apprehension existed concerning the feeding value of the new barley.

The AAA office submitted samples from representative counties and others were received directly from farmers. These samples do not represent a cross section of the Nebraska barley crop but rather an examination of the most severely affected grain from various counties.

The examination of the blighted kernels usually revealed a blackening of the basal end, sometimes involving half the total surface. In general, however, within the hulls the grains were neither shrivelled nor markedly discolored. One hundred kernels were taken at random from each sample and plated on acidified potato-dextrose agar. For surface disinfection the kernels were washed in 90 percent ethyl alcohol for one minute and then transferred to a 1 percent solution of sodium hypochlorite for 15 minutes. With this treatment 5 to 20 percent of the grains plated sterile, varying with the amount of discoloration in the sample.

Organisms isolated from blighted barley samples in Nebraska, 1941

Sample	Type and number of organisms from 100 kernels *		
	Gibberella type	Other Fusaria	Helminthosporium spp.
County			
Adams	0	5	19
Dodge	5	7	13
Douglas	1	14	20
Fillmore	3	5	22
Furnas	2	6	13
Furnas	1	4	25
Furnas	1	2	13
Jefferson	0	6	27
Kearney	1	4	19
Nuckolls	1	13	7
Otoe	0	1	**
Otoe	0	3	**
Red Willow	1	6	12
Red Willow	2	7	31
Thayer	2	5	39
Thurston	5	5	**
Thurston	4	7	**
Thurston	2	3	9
Webster	0	0	31
Webster	1	3	33

* *Alternaria* not included.
**not counted.

Listed in the table are samples from 13 counties with the results from plating. Alternaria (not listed) was the most consistent isolate, being found on 60 to 90 percent of the kernels. The ability of Alternaria to grow out from kernels subjected to the surface disinfection used might indicate a deeper development than ordinarily conceived. Helminthosporium spp. of the H. sativum type were strongly represented and without doubt the most important blight-producing factor in some of the samples. Fusarium isolates showing the general cultural and conidial characteristics of Gibberella saubinetii were counted as indicating scabby kernels. Other Fusaria are listed separately. The low percentage of kernels giving rise to Gibberella-like colonies indicated that scab was responsible for but a small fraction of the blight. If these samples are representative of the most severely blighted barley, scab should not be a problem in feeding this year's crop.

(Nebraska Agricultural Experiment Station).

OVERSUMMERING OF OAT STEM RUST ON ORCHARD GRASS IN ARKANSAS

H. R. Rosen

In connection with life history studies of crown rust on oats, some incidental studies are also being made on stem rust, Puccinia graminis avenae. The latter has been found oversummering this year on orchard grass, Dactylis glomerata, near Fayetteville, Arkansas.

The first infections were noted August 7, 1941, at the University farm. This date fell about 2 weeks after the harvesting of late spring oats. (Spring oats of 1941 were heavily infected with both crown [P. coronata] and stem rusts.) While only one clump of orchard grass was found infected on August 7, the infections were numerous and there were clear indications of secondary pustules. This clump was found in a field that had been utilized for winter oats, variety Lee, and the orchard grass, which was fairly abundant in this field, represented a volunteer stand. The large number of infections noted and the indications of secondary pustules, left little doubt that the first infections must have occurred at least 3 or 4 weeks before they were observed.

With several good August rains, volunteer oats soon appeared in the same field, some of them close to the infected clump of orchard grass. On August 25, a few small pustules of stem rust were found on some of the volunteer oats growing near the infected clump, and by September 2, quite a few additional infections were noted on these oats as well as on orchard grass. Several infected clumps of orchard grass were now noted, all centering around the clump found infected on August 7.

On October 3, 1941, the first stem rust infections were found on cultivated oats growing about 300 yards away from the infected orchard grass and the infected volunteer oats. The cultivated oats were planted September 8 and the infections found October 3 were all located on the first leaves. These infections were few and widely scattered; the largest number of pustules found on any one plant was 7. (Scattered infections of crown rust were also noted on the same date.)

This appears to be the first evidence for the oversummering of oat stem rust in the South, and much additional evidence is required before concluding that such oversummering is usual. However, this evidence is in line with and more conclusive than that found in 1940 when orchard grass infected with stem rust was found September 30 growing close to cultivated oats that were similarly infected (PDR 24: 382-383, 1940). To clarify the record, it needs to be noted that stem rust infections of the fall of 1940 on orchard grass and on cultivated oats played no role in perpetuating the rust through the winter of 1940-41. This rust, as well as crown rust, was apparently killed by an extraordinarily severe November, 1940, freeze, and no additional stem rust was discovered until the latter part of May, 1941.

(University of Arkansas).

INCIDENCE OF EAR ROTS IN THE 1940 CORN CROP

Neil E. Stevens

The available evidence indicates that in the commercial corn crop of 1940 there was a decidedly greater loss from ear rots than in the crops of 1938 or 1939.

Ear Rots in Corn at Terminal Markets

The results of licensed inspections of shelled corn received at various terminals during June, 1941 were made available, as in previous years, through the courtesy of the Grain Division, Agricultural Marketing Service, U. S. Department of Agriculture. The method of assembling information and the reasons for considering total damage in June receipts a fairly reliable index of losses due to ear rots in corn, were explained in earlier reports (PDR 19: 71-93 and 20: 63-71, 316-320).

On the map, Figure 1, there are indicated all the markets which reported receiving over 50 cars of shelled corn during June, 1941, though it is, of course, recognized that markets such as Chicago and Buffalo may receive shipments from a relatively wide area.

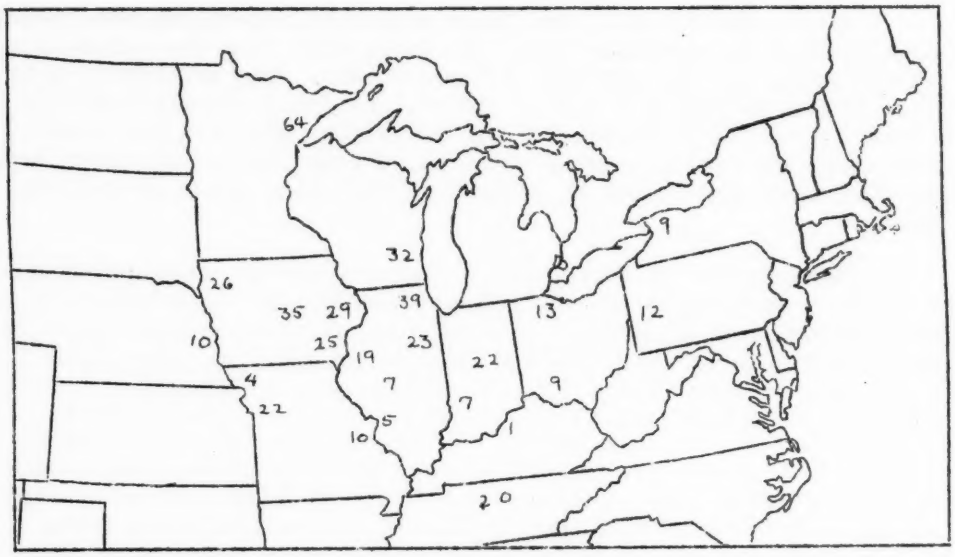

Fig. 1.--June 1941 receipts, 1940 crop. Percentage of cars of shelled corn showing 5 percent or over total damage.

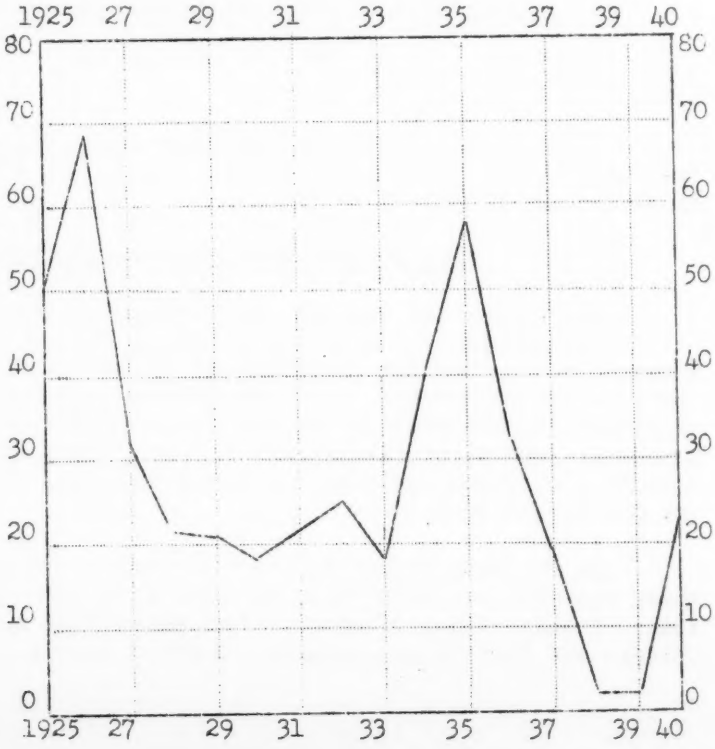

Fig. 2. Incidence of corn ear rots in the various crops as indicated by the percentage of cars of shelled corn showing 5 percent or over total damage in June of the following year.

The figures indicate the percentage of cars of shelled corn showing 5 percent or over "total damage" received during the month at Buffalo, New York; Pittsburgh, Pennsylvania; Toledo, Cincinnati, Ohio; Louisville, Kentucky; Nashville, Tennessee; Indianapolis, Terre Haute, Indiana; Chicago, Kankakee, Peoria, Decatur, East St. Louis, Illinois; Milwaukee, Wisconsin; Duluth, Minnesota; Cedar Rapids, Clinton, Keokuk, Sioux City, Iowa; St. Louis, St. Joseph, Kansas City, Missouri; and Omaha, Nebraska.

The average percentage of cars having 5 percent or more total damage for these terminals is 23, the highest (Fig. 2) since 1936 -- and contrasts with an average of 2.8 percent for all the markets reporting in June 1940 on the 1939 crop.

Data from the State Corn Performance Tests

That losses from corn ear rots were higher in 1940 than in other recent years in Iowa and Illinois is indicated by the published reports of the corn performance tests for these States. Iowa (4, p. 530) reports an average damaged seed percentage of 4.1, the highest since 1935. The average for the 6-year period (1935-1940) was 3.1 percent.

Illinois (2, p. 181) reports that "The average kernel damage from rot on all twelve of the corn-performance test fields in 1940 was 2.57 percent; in 1939 it was only 1.68 percent for all fields. This increase was due for the most part to the large amount of ear rot in the two northern fields located at Kings and Round Lake. This area received considerable rain in the late summer, whereas rainfall in most of the remainder of the State was below average during that time.

"Diplodia was the principal cause of ear rot in the northern end of the State, where ear rot was most severe. In the remainder of the State Fusarium rot appeared to be the most prevalent."

The result of this survey is also in substantial agreement with the reports in the Agricultural Marketing Service Grain Inspectors Letter for February, 1941. "December inspections at representative markets indicate that quality of the 1940 corn crop, though below that of last year's unusually good harvest, will be up to average and will compare favorably with the 1937 crop. Excess moisture, a result of the late harvest and fall rains, is principally responsible for a larger percentage of the market receipts falling into lower grades this year." (p. 4).

"Judging from the early January Chicago receipts, the 1940 corn crop does not compare in quality with the two previous crops, principally because of excess moisture content. The early receipts indicated a normal quality crop, but soon thereafter high moisture corn began to arrive and there is no indication of improved quality at the present

time. It is reported that this sudden change from comparatively dry to wet receipts is due to the violent windstorm that swept over the corn belt on November 11, blowing down much of the standing corn. This windstorm was followed shortly thereafter by heavy snow storms covering up the fallen corn before it could be harvested." (p.7).

Hoppe's preliminary report (pp. 15-16) also indicated poorer quality than during the 2 previous years and a high incidence of Diplodia.

The Canadian Plant Disease Survey also reports (1,pp.ii,23) that stalk and ear rots were very destructive in the seed corn belt of southwestern Ontario in 1940.

PUBLICATIONS FROM WHICH PORTIONS OF THE ABOVE DATA WERE OBTAINED

1. Conners, I. L. Twentieth annual report of the Canadian Plant Disease Survey. 1940. Dominion of Canada Dept. Agr. Sci. Serv. Div. Bot. & Plant Path., Ottawa, Canada, Oct. 2, 1941.

2. Copper, R. R., G. H. Dungan, A. L. Lang, J. H. Bigger, Benjamin Koehler, and Oren Bolin. Illinois corn performance tests, 1940. Illinois Agr. Exp. Sta. Bull. 474, pp. 181-182.

3. Hoppe, P. E. A preliminary report of the damaged corn survey of the 1940 crop. U. S. Dept. Agr., Agr. Mark. Serv., Grain Inspectors' Letter, February, 1941, pp. 15-16.

4. Zuber, Marcus S. and Joe L. Robinson. 1940 Iowa corn yield test. Iowa Agr. Exp. Sta. Bull. P19 (New Series).

(University of Illinois).

PLANT DISEASES IN COLORADO IN 1941

E. W. Bodine and L. W. Durrell

In Colorado the 1941 growing season has been one of the wettest on record. In many sections of the State the season was characterized by frequent showers conducive to development and spread of plant diseases.

Downy mildew of onion (Peronospora schleideni [P. destructor]), rarely found in the State, was in epiphytotic form in the Brighton and Littleton districts. Purple blotch of onion (Macrosporium [Alternaria] porri), was generally destructive in the Rocky Ford region, where but traces of the disease had been found during the past 10 years.

Infection by Phytophthora capsici was prevalent on cucumbers and squash in Weld County and on tomato, Honeydew melon, cucumber, and squash in the Arkansas Valley. This organism caused rot in the field to the extent that it was a limiting factor in production and caused considerable damage in shipments in transmit. A Fusarium dry rot of cantaloupe was also responsible for serious losses in transit. Anthracnose on Honeydew melons (Colletotrichum lagenarium) was prevalent in the Arkansas Valley. This disease has not been found since 1931 but this year reached economic proportions.

Downy mildew of peas (Peronospora viciae) was observed in the Longmont region and downy mildew of alfalfa (P. trifoliorum), which has not been noted for several years, was of importance in the San Luis Valley and San Juan Basin areas. A seedling blight and a crown rot of alfalfa (Phoma sp.) became an important factor in establishing and maintaining stands in the San Luis Valley.

Early blight of potatoes (Alternaria solani) which is seldom of any great importance, increased to serious proportion in Weld County. On the other hand, ring rot of potatoes (Phytomonas sepedonica) declined in prevalence the past season.

In many districts frequent rains aided in the development and spread of leaf spot of sugar beet (Cercospora beticola) to a degree not observed for years. Curly top [virus] of sugar beets was found in the northeastern part of the State, where its presence is rare.

Several diseases not heretofore found in Colorado made their appearance this year. They are as follows: Charcoal-rot of corn (Sclerotium bataticola) was found in the southeast corner of the State. Orange rust (Kunkelia nitens) on dewberry was first reported from Lamar. Tilletia tritici was found for the first time in Montezuma, Moffat, and Routt Counties. This disease caused serious losses and it appears that the usual seed treatment, which is widely practiced, did not give control. Basisporium gallarum [Nigrospora sphaerica] was found on sorghum causing serious damage and destruction of some 200 acres of grain in Morgan County.

Cytospora chrysosperma, common on poplars in the State, this year took a heavy toll of Chinese elms following severe winter injury. Large numbers of these trees in the eastern part of the State were damaged by an early frost in November and Cytospora completed the destruction. Coryneum blight of peach (Coryneum beijerinckii), which is usually present in small amount, was prevalent this past season.

(Colorado Agricultural Experiment Station).

BRIEF NOTES ON PLANT DISEASES

HELMINTHOSPORIUM LEAF SPOT ON MILLET IN NEW JERSEY: Specimens of German millet (Setaria italica) with a severe case of leaf spot, caused by a Helminthosporium, were sent to us on September 14, 1941 by Fred W. Shropshire, Game Conservator, New Gretna, New Jersey with the comment that the "samples were taken from one of our feed patches on the Manahawkin Public Shooting ground." Dr. A. G. Johnson of the Division of Cereal Crops and Diseases, U. S. Bureau of Plant Industry, who examined the specimen, reports that "the fungus is clearly Helminthosporium setariae as described by Sawada in 1912." The disease seems to have been reported very infrequently. (C. M. Haenseler, New Jersey Agricultural Experiment Station. October 7).

SOUTHERN WILT ON LILIES IN OREGON: We have received specimens of Regal lilies from the Umpqua River Valley of Oregon that show serious damage from the southern wilt fungus, Sclerotium rolfsii. At rare intervals this fungus attacks iris and tulips in Western Oregon. The present occurrence is our first record of the fungus on lilies. The data sent to us indicates that iris were first infected and then lilies in adjacent beds became diseased. (Frank P. McWhorter, Oregon Agricultural Experiment Station. October 2).

CHECK LIST REVISION

Freeman Weiss

PICRAMNIA (SIMAROUBACEAE)

PICRAMNIA PENTANDRA Sw., BITTERBUSH. Shrub or small tree of S. Fla. and the West Indies.

Phyllachora domingensis Chardon, black leaf spot. P.R.

PIERIS (ERICACEAE)

PIERIS spp., chiefly P. FLORIBUNDA (Pursh) Benth. & Hook. (Andromeda floribunda Pursh), MOUNTAIN ANDROMEDA, evergreen shrub of Growth Region 27, cult. as ornamental, Zone IV; and P. JAPONICA (Thunb.) D. Don, JAPANESE ANDROMEDA, cult. as ornamental, Zone V.

Pestalotia sp., leaf spot. Conn., N. J.
Phyllosticta andromedae Westend., leaf spot. N. J.
P. maxima Ell. & Ev., Conn., N.J.
Phytophthora sp.,dieback. Pa.

PIMENTA (MYRTACEAE)

PIMENTA ACRIS (Sw.) Kostel, BAY-RUM TREE. Small tree of tropical America, source of oil of myrica.

Meliola amomicola F. L. Stevens, black mildew. P.R.

PIMENTA OFFICINALIS Berg., ALLSPICE, PIMENTO. Small tree of tropical America, cult. for fruit used as a condiment.

Puccinia psidii Wint., rust (II,III). Known only in Jamaica, British West Indies, but mentioned here because of its economic interest and the occurrence of a different biological form of this rust on Eugenia jambos and Psidium guajava in P. R.

PINUS (PINACEAE)

PINUS spp. Occurring on various or undetermined spp.

Arceuthobium americanum Nutt. ex Engelm., lodgepole pine dwarf mistletoe. On the Rocky Mt. form of P. contorta (var. murrayana) but not the Pacific Coast form; rarely on other pines.

A. campylopodum Engelm., Western dwarf mistletoe. Occurs in several host forms distinguished as follows: forma typicum Gill, commonly on P. coulteri, P. Jeffreyi, P. ponderosa, P. radiata, P. sabiniana, and rarely on P. attenuata and P. contorta; forma divaricatum (Engelm.) Gill on P. cembroides, P. edulis, P. monophylla and P. parryana; forma cyanocarpum (A. Nelson) Gill commonly on P. flexilis, also on P. albicaulis, P. aristata and P. balfouriana; forma blumeri (A. Nelson) Gill on P. lambertiana, P. monticola and P. strobiformis. N. and S. Rocky Mt. States to Pacific Coast.

A. vaginatum (Willd.) Presl, Southwestern dwarf mistletoe. On P. apacheca, P. arizonica and P. leiophylla, S. Rocky Mt. States. A.v. forma cryptopodum (Engelm.) Gill occurs on P. ponderosa and its var. scopulorum in Ariz., Colo., N.Mex., Texas and Utah.

Armillaria mellea Vahl ex Fr., root rot. Widespread.

Atropellis spp., branch and trunk canker, bluish-black wood stain. The reported spp. are: A. arizonica Lohman & Cash, on P. ponderosa in Ariz.; A. pinicola Zeller & Goodding on P. monticola and P. contorta in the Pacific N.W. and on P. lambertiana in Calif.; A. piniphila (Weir) Lohman & Cash on P. albicaulis, P. contorta and P. ponderosa in the Pacific N.W., also in Ariz., N. Mex., Ala. and Tenn.; A. tingens Lohman & Cash on various pines from New England to Fla., Ark. and Ohio.

Bifusella linearis (Pk.) Höhn., tar spot needle cast. Me. to N.Car. and Minn., Idaho and Wash.

PINUS -- continued.

B. striiformis Darker, on P. sabiniana and P. torreyana. Calif.
Botrytis cinerea Pers., seedling blight. Cosmopolitan.
Cadophora brunnescens Davidson and C. repens Davidson, wood stain. Fla., La.
Caliciopsis pinea Pk., on bark. N.Y.
Cenangium ferruginosum Fr. (C. abietis Pers. ex Rehm), twig blight. Me., N.J., Ohio, Mont. to Oregon and Wash.
Ceratostomella spp., blue or gray stain of wood (by some spp.) possibly also tracheomycosis. The most prevalent and widespread spp. are C. pilifera (Fr.) Wint. and C. ips Rumbold. Other spp. reported as associated with wood stain, chiefly in the Southern States are C. exigua Hedgc., C. multiannulata Hedgc. & Davidson, C. obscura Davidson, C. pini Münch, and C. pluriannulata Hedgc.
Coleosporium apocynaceum Cke. (Peridermium apocynaceum Hedgc. & Hunt), needle rust (O,I). On P. caribaea and P. palustris, S. E. States. II and III on Amsonia spp.
C. campanulae (Pers.) Lév. (Peridermium rostrupi Ed. Fischer), needle rust (C,I). On P. resinosa, P. rigida, and P. virginiana; New England to Ind. and N. Car. II and III on Campanula, Specularia, and Lysimachia.
C. crowellii Cummins, needle rust (III). On P. edulis and P. flexilis in Ariz., Colo., N. Mex.
C. delicatulum (Arth. & Kern) Hedgc. & Long (Peridermium delicatulum Arth. & Kern), needle rust (O,I). On P. caribaea, P. echinata, P. palustris, P. resinosa, P. rigida, P. serotina and P. taeda; New England to Fla., west to Great Plains. II and III on Euthamia spp.
C. elephantopodis (Schw.) Thüm. (Peridermium intermedium Arth. & Kern, needle rust (C,I). On P. caribaea, P. echinata, P. palustris, P. rigida, P. serotina and P. taeda; N.J. to Fla., Texas and Ill. II and III on Elephantopus spp.
C. helianthi (Schw.) Arth. (Peridermium helianthi Hedgc. & Hunt), needle rust (O,I). On P. echinata and P. virginiana, N.Y. to Ga. and Ohio. II and III on Helianthus spp.
C. inconspicuum (Long) Hedgc. & Long (Peridermium inconspicuum Long), needle rust (O,I). On P. echinata, P. palustris, and P. virginiana; Md. to Ga., Tenn. and Ohio. II and III on Coreopsis spp.
C. ipomoeae (Schw.) Burr. (Peridermium ipomoeae Hedgc. & Hunt), needle rust (O,I). On P. caribaea, P. chihuahuana, P. echinata, P. palustris, P. rigida, P. serotina, and P. taeda; N. J. to Fla., Ill. and Ariz. II and III on Ipomoea spp. and other Convolvulaceae.
C. jonesii (Pk.) Arth. (Peridermium ribicola Long), needle rust (C,I). On P. edulis in Ariz., Colo., N. Mex. II and III on Grossularia and Ribes spp.

PINUS -- continued.

C. laciniariae Arth. (Peridermium fragile Hedgc. & Hunt), needle rust (C,I). On P. palustris, P. rigida, and P. taeda; N. J. to Fla. II and III on Liatris spp.

C. madiae Cke. (Peridermium californicum Arth. & Kern), needle rust (O,I). On P. radiata, Calif. II and III on various Compositae.

C. minutum Hedgc. & Hunt (Peridermium minutum Hedgc. & Hunt), needle rust (O,I). On P. glabra and P. taeda, Fla. II and III on Forestiera ligustrina.

C. pinicola Arth., needle rust (III). On P. virginiana, Del. to N. Car. and Tenn.

C. senecionis (Pers.) Fr. (Peridermium oblongisporium Fckl.). Collected twice in II and III stages on Senecio vulgaris, Colo., R.I.

C. solidaginis (Schw.) Thüm. (Peridermium acicolum Underw. & Earle), needle rust (O,I). On all 2- and 3-needle pines in E. U.S.; also reported on P. contorta and P. ponderosa in the West, but this is possibly a distinct sp., Peridermium montanum Arth. & Kern. II and III on various Compositae, commonly Aster and Solidago spp.

C. sonchi-arvensis (Pers.) Lév. (Peridermium fischeri Kleb.), needle rust (O,I). On P. sylvestris, Wis. II and III on Sonchus asper.

C. terebinthinaceae (Schw.) Arth. (Peridermium terebinthinaceae Hedgc. & Hunt), needle rust (O,I). On P. echinata, P. serotina, P. taeda and P. virginiana. S.E. States. II and III on Parthenium and Silphium.

C. vernoniae Berk. & Curt. (Peridermium ravenelii Kleb.), needle rust (O,I). on various 2- and 3-needle pines from Mass. to Fla., Texas and Kans. II and III on Vernonia.

Coniophora arida (Fr.) Karst. and C. cerebella Pers. ex Schroet., brown cubical rot of logs and timber. Widespread.

Cronartium coleosporioides (Diet. & Holw.) Arth. (Peridermium filamentosum Pk.), lodgepole pine blister rust (O,I) with swellings on twigs and branches and trunk cankers. On P. contorta, P. jeffreyi and P. ponderosa; N. and S. Rocky Mts., Sierra Nevada Mts. and high plateaus throughout the West, also Alaska. II and III on Castilleja, Cordylanthus, Orthocarpus and Pedicularis.

C. comandrae Pk. (Peridermium pyriforme Pk.), Comandra blister rust (O,I) with swellings on twigs and trunks. On P. arizonica, P. contorta and P. ponderosa in the Rocky Mt. States to Calif. and Wash.; on P. banksiana, P. pinaster, P. pungens and P. sylvestris in the East.

C. comptoniae Arth. (Peridermium comptoniae Orton & Adams), sweet-fern blister rust (O,I) with swellings on branches and trunks. On 2- and 3-needle pines from the N.E. States to the Central

PINUS -- continued.

and Great Lakes States; on P. contorta and P. ponderosa in Calif. II and III on Comptonia peregrina and Myrica gale.

C. conigenum (Pat.) Hedgc. & Hunt, cone rust. On P. chihuahuana, causing hypertrophy of cones. Ariz. II and III on Quercus emoryi and Q. hypoleuca. See also C. quercuum.

C. fusiforme (Pk.) Hedgc. & Hunt (Peridermium fusiforme Arth. & Kern), Southern fusiform rust (O,I) with swellings on branches & trunks. On P. caribaea, P. serotina and especially P. taeda, in the South. II and III on evergreen Quercus spp.

C. harknessii Meinecke (Peridermium harknessii Moore), Western gall rust (O?,I) with galls on branches & trunks, also witches'-brooms. On P. contorta, P. jeffreyi, P. ponderosa and P. sabiniana throughout the mountain regions of the West. II and III on Castilleja, or omitted with I repeating on pines. A different var. or sp., provisionally named Peridermium cerebroides Meinecke, occurs on P. attenuata and P. radiata in the coastal parts of California; no alternate stage is known, I (and rarely O)repeating on pines. Both have been considered to be forms of C. coleosporioides and C. cerebrum but are segregated here because of their distinctive pathological effects.

C. occidentale Hedgc., Bethel & Hunt, pinõn blister rust (O,I) with swellings on branches & trunks. On P. edulis and P. monophylla in Colo. to Ariz. and Calif. II and III on Grossularia and Ribes spp.

C. quercuum (Berk.) Miyabe (C. cerebrum Hedgc. & Long, Peridermium cerebrum Pk.), Eastern gall rust (O,I) with galls on branches & trunks, also witches'-brooms. On 2- and 3-needle pines in the Eastern States to the Rocky Mts., especially in the S. E. States. II and III on Quercus spp., and rarely Castanea. According to Arthur this sp. covers C. conigenum, C. fusiforme, and C. strobilinum, which are segregated here because of their distinctive pathological effects. The gall rust on Pacific Coast pines, which has been designated as C. cerebrum, later as C. cerebroides Meinecke, is listed here under C. harknessii. The form known as Woodgate rust, on P. sylvestris in N.Y. and Mich. which also is characterized by a repeating I stage and the absence of a known III stage, is tentatively placed here.

C. ribicola Ed. Fischer (Peridermium strobi Kleb.), white pine blister rust (O,I) with swellings on branches & trunks. On P. strobus from New England to Va. and Minn.; on P. monticola in the Pacific N.W. and on P. lambertiana in Calif. II and III, Grossularia and Ribes spp.

C. strobilinum (Arth.) Hedgc. & Hahn, cone rust (O,I). On P. heterophylla and P. palustris, causing hypertrophy of cones in Fla. and Miss. II and III on evergreen Quercus spp. See also C. quercuum.

(Division of Mycology and Disease Survey).

SEPTEMBER WEATHER

(U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for week ending October 7, 1941).

Figure 1 shows that September was abnormally wet in the western Lake region, Illinois, and in all States west of the Mississippi River, except Nevada and California. While deficiencies are indicated for the east Gulf States, the amounts were above normal in immediate Gulf sections, except in southern Florida. Very little rain occurred in the northern portions of the east Gulf States, the central and eastern Ohio Valley, the eastern Lake region and the Atlantic States from New England to Georgia. In the northern Great Plains it was the wettest September since 1900, and New Mexico had an inch more rainfall than has ever occurred in any month, while in some middle Atlantic areas it was the driest of record. These data afford an interesting study of weather vagaries.

Figure 2 indicates that September temperatures averaged above normal over the eastern half of the country, except very locally, and decidedly below normal in the Great Basin and far Northwest, although most of the Pacific coast had slightly above normal warmth.

THE DROUGHT IN THE EASTERN STATES

(U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for week ending October 7, 1941).

This year so far has brought to the United States very unusual moisture conditions, in that the normally drier western half of the country has had a persistency of unusually abundant rainfall, while the more humid Eastern States have suffered two severe droughts. During the late winter and spring months precipitation was very scanty in Eastern States, the spring being the driest of record in West Virginia, Ohio, Kentucky, and Tennessee and the second driest in Virginia, Pennsylvania, New York, and New England.

However, the first half of June brought to the dry area substantial rainfall quite generally which effectively relieved the agricultural situation, but the rains were not heavy enough to penetrate deeply and the subsoil remained relatively dry. Fortunately, they were such as to insure favorable returns of staple crops.

Following the summer respite from droughty conditions, another drought period set in the latter part of August which by the first of October had assumed serious and widespread proportions, covering the entire Atlantic area and extending westward to the central Ohio Valley

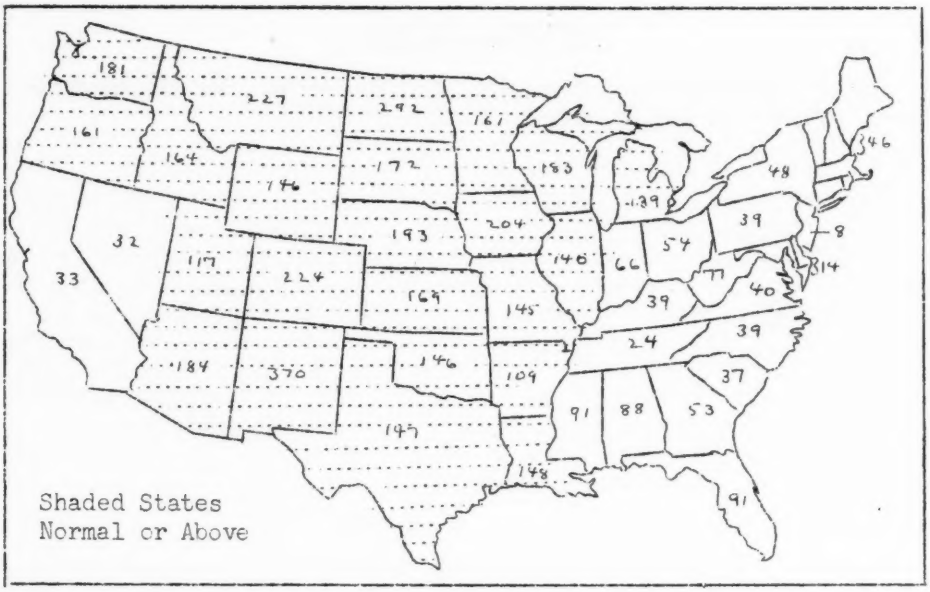

Fig. 1.-Percentage of Normal Precipitation by States, September 1941.

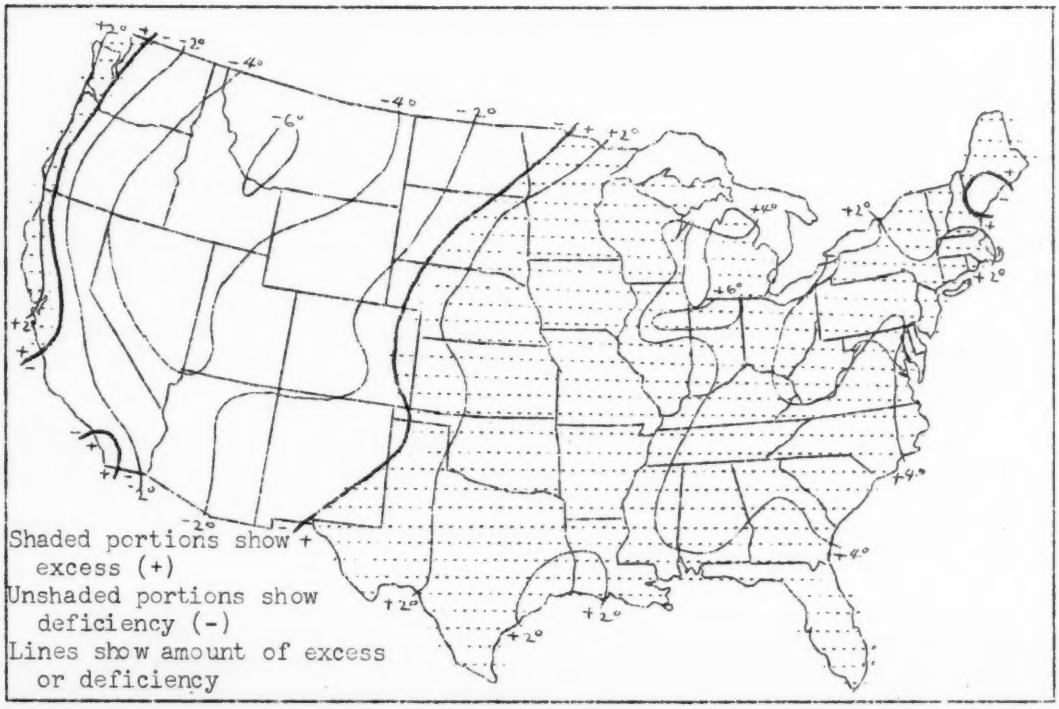

Fig. 2.-Departure of Mean Temperature from the Normal for September 1941.

and Tennessee. An unusual feature of September rainfall was the widespread uniformity in deficiencies; South Carolina had 37 per cent of normal; North Carolina, 39 percent; Virginia, 40 percent; Pennsylvania, 39 percent and Kentucky, 39 percent. New Jersey had an average of only 0.30 inch, or 8 percent of normal and the driest September of record, while Maryland and Delaware had only 14 percent of normal, the least since 1884.

Some individual localities had much smaller amounts, such as Trenton, N. J., 6 percent of normal and Lynchburg, Va., 3 percent, both representing the driest September of record. Many other stations reported from 15 to 20 percent of normal. In the vicinity of Philadelphia, it was the driest September since 1915, in western North Carolina since 1919, and in the District of Columbia since 1884.

However, in relation to agriculture, conditions this year in the Central-Eastern States are not comparable to the record drought of 1930. That year large deficiencies in precipitation extended from the spring season through the summer and into the fall, whereas this year summer rainfall was about normal which relieved the surface soil situation, and favored staple crops, though the sub-soil continued dry. This dryness of the sub-soil has a bearing on the current situation with regard to wells, springs and streams which have become the lowest generally reported since 1930 and for 50 years in some northeastern areas.

The unusual features of this year's rainfall are emphasized by comparing Kansas, normally a relatively dry State, with Virginia in the humid area of the country, having 50 percent more rainfall, on the average. This year, through September, Kansas has had nearly 15 percent more rainfall than Virginia. The latter's deficiency 8.35 inches, for the 9 months, expressed in actual water shortage, is some 950 tons, on the average, for every acre of land. To complete the comparison, the excess above normal in Kansas, 5.75 inches, represents about 650 tons of water per acre more than normally is received.

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